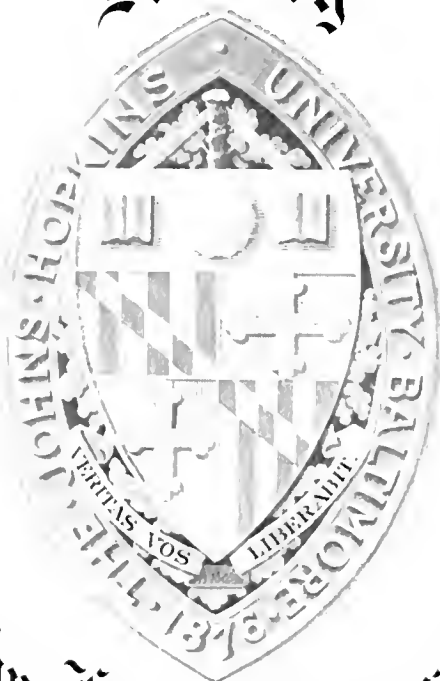


Library



Johns Hopkins University
of the

INSTRUMENTAL ANALYSIS OF THE EFFECTS OF
THE FIELD OF A DIELECTRIC ON THE CONDUCTIVITY OF A
WIRE

BY J. H. HARRIS

In 1908 Dr. J. H. Harris published a paper in the *Journal of the American Chemical Society*, Vol. 30, No. 1, p. 1, in which he described the effect of the field of a dielectric on the conductivity of a copper wire. He described the effect of the field of a dielectric on the conductivity of a copper wire with about thirty different dielectrics -- liquids and vapors -- and concluded that in general the conductivity was affected, in some cases increased, and in others decreased, by the field of a dielectric. He found that the conductivity of a copper wire was increased by 25 per cent.

In a later paper, "A New Method of Measuring the Conductivity of a Dielectric," he referred to a similar observation, but he did not mention the effect of the field of a dielectric on the conductivity of a wire. He found that the conductivity of a dielectric was affected, in some cases increased, and in others decreased, by the field of a dielectric.

1. Harris, J. H., *Journal of the American Chemical Society*, Vol. 30, No. 1, p. 1, 1908.
2. Harris, J. H., *Journal of the American Chemical Society*, Vol. 30, No. 1, p. 1, 1908.
3. Harris, J. H., *Journal of the American Chemical Society*, Vol. 30, No. 1, p. 1, 1908.

11

... ..

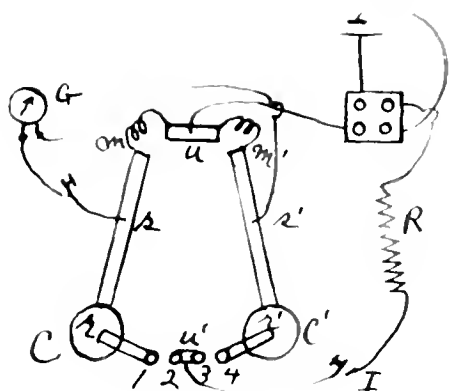
... ..

Dielsastute	Volume in liters	Price per liter	Volume in liters	Price per liter	Percent change
Petroleum	1.0010	-0.0000	1.0010	-0.45	-0.10
Varied	1.0010	-0.0000	1.0010	-0.25	-0.00
Oil of	1.0010	-0.0000	1.0010	-0.25	-0.00
... ..	1.0010	-0.0000	1.0010	-0.25	-0.00
Wood Alcohol	.0000	0.0000	.0000	+0.05	+0.00
Petroleum	.0000	0.0000	.0000	+0.10	+0.00
Wood Alcohol and	.0000	0.0000	.0000	+0.30	+0.10
Petroleum	.0000	0.0000	.0000	+0.30	+0.10
Absolute Alcohol	.0000	+0.0000	.0000	+0.40	+0.10
Wood Alcohol and	.0000	0.0000	.0000	+0.30	+0.10
Petroleum	.0000	0.0000	.0000	+0.30	+0.10
Insoluble0000	0.0000	.0000	+0.30	+0.10
Chloroform vapor	.0000	+0.0000	.0000	+0.30	+0.10
Oil0000	0.0000	.0000	+0.30	+0.10
Ether Vapor	.0000	+0.0000	.0000	+0.30	+0.10
Alcohol Vapor	.0000	+0.0000	.0000	+0.30	+0.10
Oil Vapor	1.				
Perfumed air	1.				

-1-

The first experiment was made with a wire of diameter 0.01 cm. and length 10 cm. The wire was placed in a glass tube of diameter 0.5 cm. and length 10 cm. The tube was filled with a liquid of dielectric constant 1.5. The wire was connected to a battery of 100 volts. The current was measured with a milliammeter. The current was found to be 0.01 amp. The resistance of the wire was calculated from the current and voltage. The resistance was found to be 10 ohms. The resistance of the wire was compared with the resistance of a wire of the same length and diameter but made of a different material. The resistance of the second wire was found to be 10 ohms. The resistance of the two wires was found to be the same. This shows that the resistance of a wire is independent of the dielectric constant of the liquid in which it is placed. The amount of the effect seemed to depend on the diameter of the wire. The amount of the effect seemed to depend on the length of the wire. The amount of the effect seemed to depend on the dielectric constant of the liquid. The amount of the effect seemed to depend on the temperature of the liquid. The amount of the effect seemed to depend on the frequency of the current. The amount of the effect seemed to depend on the shape of the wire. The amount of the effect seemed to depend on the material of the wire. The amount of the effect seemed to depend on the length of the wire. The amount of the effect seemed to depend on the diameter of the wire. The amount of the effect seemed to depend on the dielectric constant of the liquid. The amount of the effect seemed to depend on the temperature of the liquid. The amount of the effect seemed to depend on the frequency of the current. The amount of the effect seemed to depend on the shape of the wire. The amount of the effect seemed to depend on the material of the wire.

•



For $\gamma = 0.1$ and $\beta = 0.1$ we have

$$I = 0.1 \quad \text{and} \quad I' = 0.1$$

that is, the values of I and I' are equal.

For $\gamma = 0.1$ and $\beta = 0.2$ we have

$$I = 0.1 \quad \text{and} \quad I' = 0.2$$

that is, the value of I' is twice the value of I .

For $\gamma = 0.1$ and $\beta = 0.3$ we have

$$I = 0.1 \quad \text{and} \quad I' = 0.3$$

that is, the value of I' is three times the value of I .

For $\gamma = 0.1$ and $\beta = 0.4$ we have

$$I = 0.1 \quad \text{and} \quad I' = 0.4$$

that is, the value of I' is four times the value of I .

For $\gamma = 0.1$ and $\beta = 0.5$ we have

$$I = 0.1 \quad \text{and} \quad I' = 0.5$$

that is, the value of I' is five times the value of I .

For $\gamma = 0.1$ and $\beta = 0.6$ we have

$$I = 0.1 \quad \text{and} \quad I' = 0.6$$

that is, the value of I' is six times the value of I .

For $\gamma = 0.1$ and $\beta = 0.7$ we have

$$I = 0.1 \quad \text{and} \quad I' = 0.7$$

that is, the value of I' is seven times the value of I .

For $\gamma = 0.1$ and $\beta = 0.8$ we have

$$I = 0.1 \quad \text{and} \quad I' = 0.8$$

that is, the value of I' is eight times the value of I .

For $\gamma = 0.1$ and $\beta = 0.9$ we have

$$I = 0.1 \quad \text{and} \quad I' = 0.9$$

1 2

Δ

=

low :-

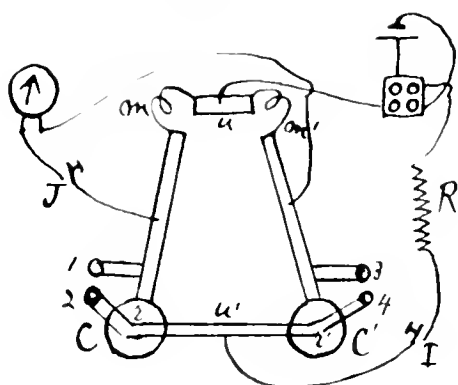
Δ

$\frac{\Delta}{R}$

I		00-10	.00
1.00		31	
1.01		4	
1.02		17	

the ...
the ...
with ...
which ...
the ...
the ...
and ...

Fig. "b"



Δ

$\frac{A}{R}$

- a

± 0.0004

Dis.

had

ρ

$$\Delta =$$

$$\frac{\Delta}{R} =$$

$$\lambda =$$

$$\beta =$$

$$-$$

ρ

Δ

Δ

$\frac{A}{R}$

But possibly they used some volatile solvent to free the tube of petroleum;

" 37 "

[]

to not

it

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

B. and S. gauge

A

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

au

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

11-11

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1990年12月24日

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in financial matters. The text outlines various methods for organizing and storing data, including digital databases and physical filing systems. It also mentions the need for regular audits and reviews to ensure the integrity of the information.

2. The second section focuses on the role of communication in achieving organizational goals. It highlights the importance of clear and concise communication, both internally and externally. The text provides guidelines for effective communication, such as using appropriate language, listening actively, and providing feedback. It also discusses the benefits of open communication and how it can foster a collaborative work environment.

3. The third part of the document addresses the issue of resource management. It discusses the importance of identifying and allocating resources effectively to support the organization's mission. The text provides strategies for managing resources, including budgeting, prioritizing tasks, and delegating responsibilities. It also mentions the need for regular monitoring and evaluation of resource usage to ensure optimal performance.

4. The fourth section discusses the importance of continuous learning and development. It emphasizes that individuals and organizations must stay up-to-date with the latest trends and technologies in their field. The text provides suggestions for ongoing education, such as attending workshops, conferences, and taking courses. It also discusses the importance of fostering a culture of learning and innovation within the organization.

5. The fifth and final part of the document discusses the importance of maintaining a strong ethical foundation. It emphasizes that ethical behavior is essential for building trust and credibility with stakeholders. The text provides guidelines for ethical decision-making, such as being honest, transparent, and respectful. It also mentions the need for regular training and education on ethical issues to ensure that all employees understand and adhere to the organization's values.

bout

3d

1 Univ. Circulars, June, 1897.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial data. This includes not only sales and purchases but also expenses and income. The document further states that regular audits are necessary to verify the accuracy of these records and to identify any discrepancies.

In addition, the document highlights the need for transparency in financial reporting. It suggests that all stakeholders should have access to the relevant financial information to make informed decisions. This transparency is crucial for building trust and ensuring the long-term success of the organization.

The second part of the document focuses on the implementation of financial controls. It outlines various measures that can be taken to prevent fraud and mismanagement of funds. These include the separation of duties, the use of internal controls, and the establishment of a strong corporate governance framework. The document also mentions the importance of training employees on financial policies and procedures to ensure they are followed consistently.

Finally, the document concludes by reiterating the importance of financial discipline and accountability. It encourages the organization to maintain a high level of financial integrity and to strive for continuous improvement in its financial management practices.

EN

1 2

1

20 11

2 2 2

1 2

1 2

1 2

1 2

2

“

2

2

2

V

, ,

1

/ /

1

•

1

1

1

2.

2

V

1

,

1

11

10

1

2

4

2

0

that

^

Next the copy for distribution was put back and the measurement of
the offset distance was made.

A.M
9:00

1 2-

0

1

1.

1

2.

1
2
3

γ	η	θ	ϕ	ψ	ω
----------	--------	----------	--------	--------	----------

2 2.

2

1 2 }

1 2 }

α

α

α -

1 2

2

0.8 //

2 -

for 0.021.

1 2

0

1 2

0.

1

2

2

2

2

1

2

3

— —

2

2

with
/

which would correspond in my tube and wire to a decrease of ^{18%} of

that of
A

Q

1

1 2

1

2

1-1-2

1 -
1 -

$$\frac{1}{\sqrt{1-z^2}} = \sum_{n=0}^{\infty} \binom{2n}{n} \frac{z^{2n}}{4^n}$$

1 2

 α

2

1

1

1 2

00

0

1 2

d

h

t

0

2 - 0. }

2

3

0

84

2

2

Vapor

1

2

3

Aug

0

2

1

0.

ed

of resistance
^

0.

0

0.

0

1 2

2

2

0

5

1 2

1

0

0

2

5

0

0.

0

1 1 1 1

5

2

1

2625 29
0

.0

2

1.
2.

}

1

2

1

1

1

1

0.2

3

2

1

that the
^

' 0.

²
2 0

}

1 2

3

7

-

-

-

-

-

0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

1.0

(1)

100

1

2

0

h

h

f

2

2

5

0

2
2
}

1. 100

2. 100

3. 100 100 100

4. 100 100 100

5. 100 100 100

6. 100 100 100

7. 100 100 100

8. 100 100 100

9. 100 100 100

10. 100 100 100

11. 100 100 100

12. 100 100 100

13. 100 100 100

14. 100 100 100

15. 100 100 100

16. 100 100 100

17. 100 100 100

18. 100 100 100

19. 100 100 100

20. 100 100 100

21. 100 100 100

22. 100 100 100

23. 100 100 100

24. 100 100 100

25. 100 100 100

26. 100 100 100

27. 100 100 100

28. 100 100 100

1

1

1

1

1 - 2 0

1 2 0

1 - 2 0

1

1

1

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

1

1 2

1

1

1

1

1

1

1

1 0

1

1

1

1

1

1

8.00

0.

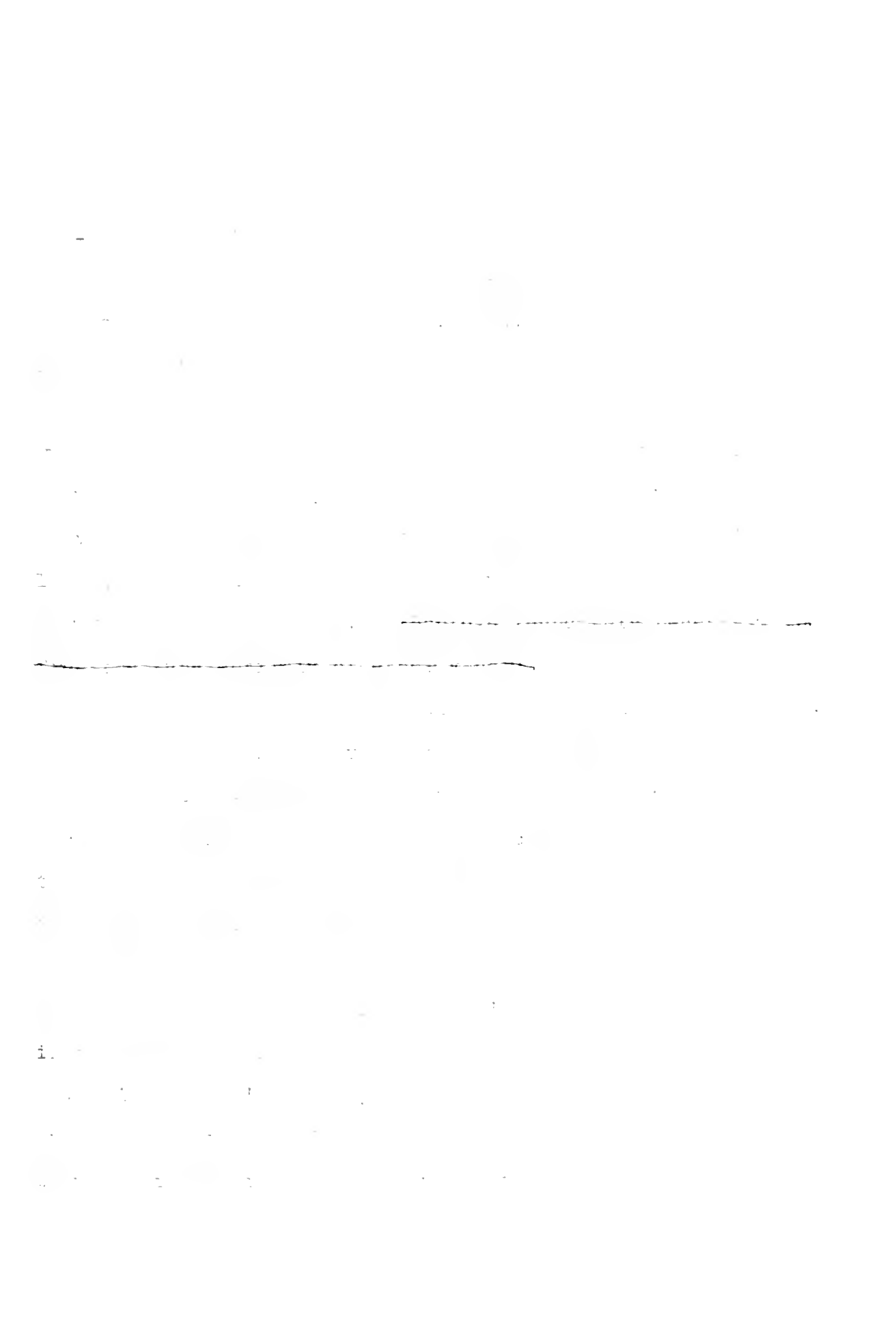
2

1 1

0

1 0 2 0 }

2
2



$$\left. \begin{array}{l} 1 \\ 0 \end{array} \right\} \begin{array}{l} W_2 \\ P_2 \end{array} \quad 0.$$

2

()

1

2

0

2

2

2

,

,

1

2
2

}

3

1

2

..

..

.

.

..

..

—

—

—

—

—

0

—

2

1

2

2

0

2

eds

8-5

0. 1

0. 2

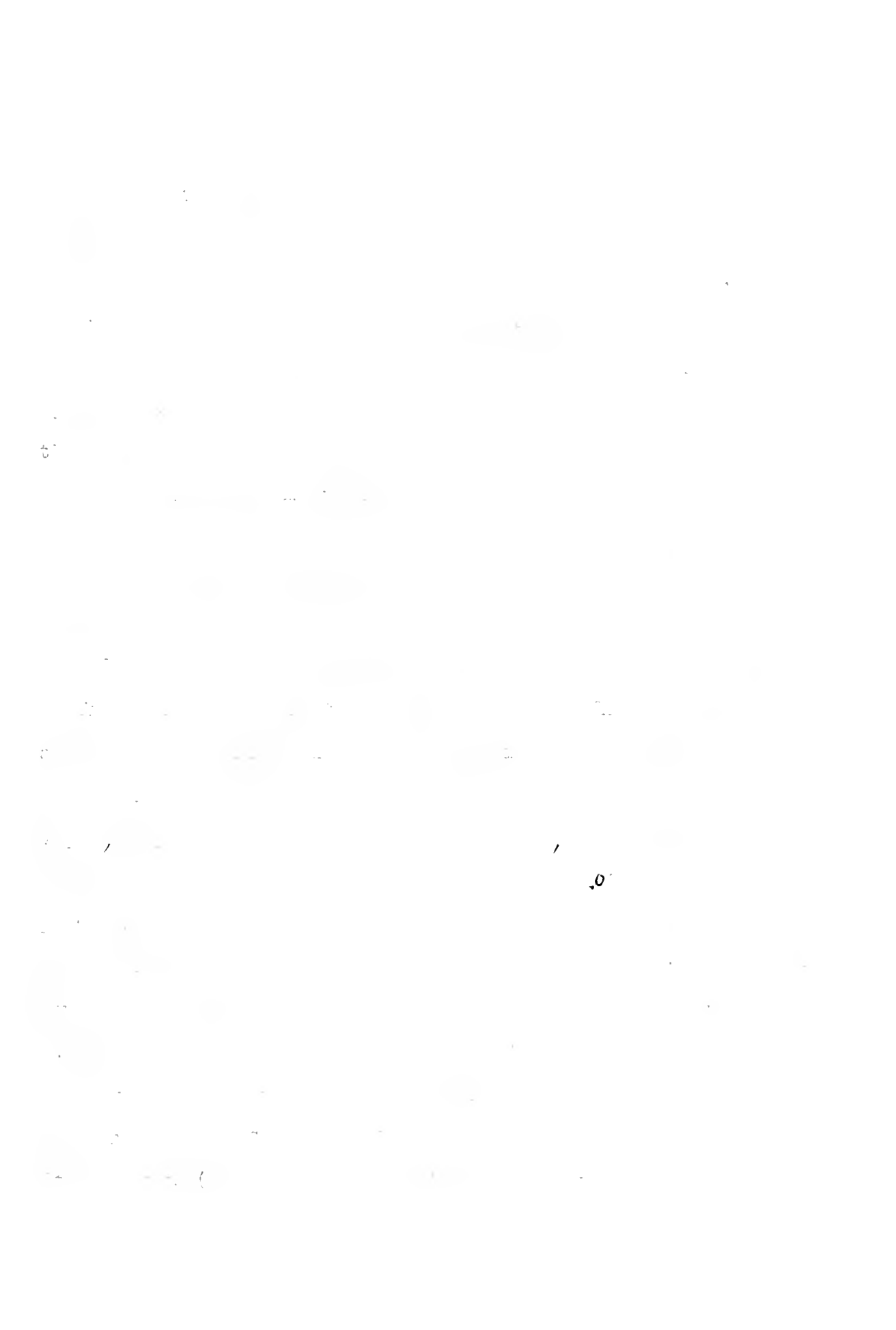
0

2

2.

2

1.



before

3

"

"

"

not true

^

R

1

2

3

4

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

1 0.

2 0.

}

1.

1

2

1

1

1

1

1

1

1

1

1

1

1

0.

2.

2

11.

1

3

7180 6090

4

1

11

11

11

{

$\frac{1}{1} = 0$

$\frac{1}{2}$
 $\frac{1}{2}$

}

—

—

—

—

11

11

—

—

—

—

11

11

11

—

—

—

—

—

11

—

—

—

—

—

11

—

—

—

—

—

—

—

1 2

2

0

' 0 2 0 }

- / 2

- 3

-

-

-

-

-

-

-

-

-

0

0

1

1

1

0

Sg

Squ

24

1 0 2 0 }

1 2

1

3

9

.3

0.00

0.

0

2

0

of Chicago

f.

)

2

49-50

57

62

83

100-1

1 }

2 }

S₉₇

57-8, 57'
63-64

65-6

68

71

79

86-90

92

93

96-7

111 .

1

2

2

2

2

2

of Philadelphia

^

Phila.

1840

1841

1842

1843

no

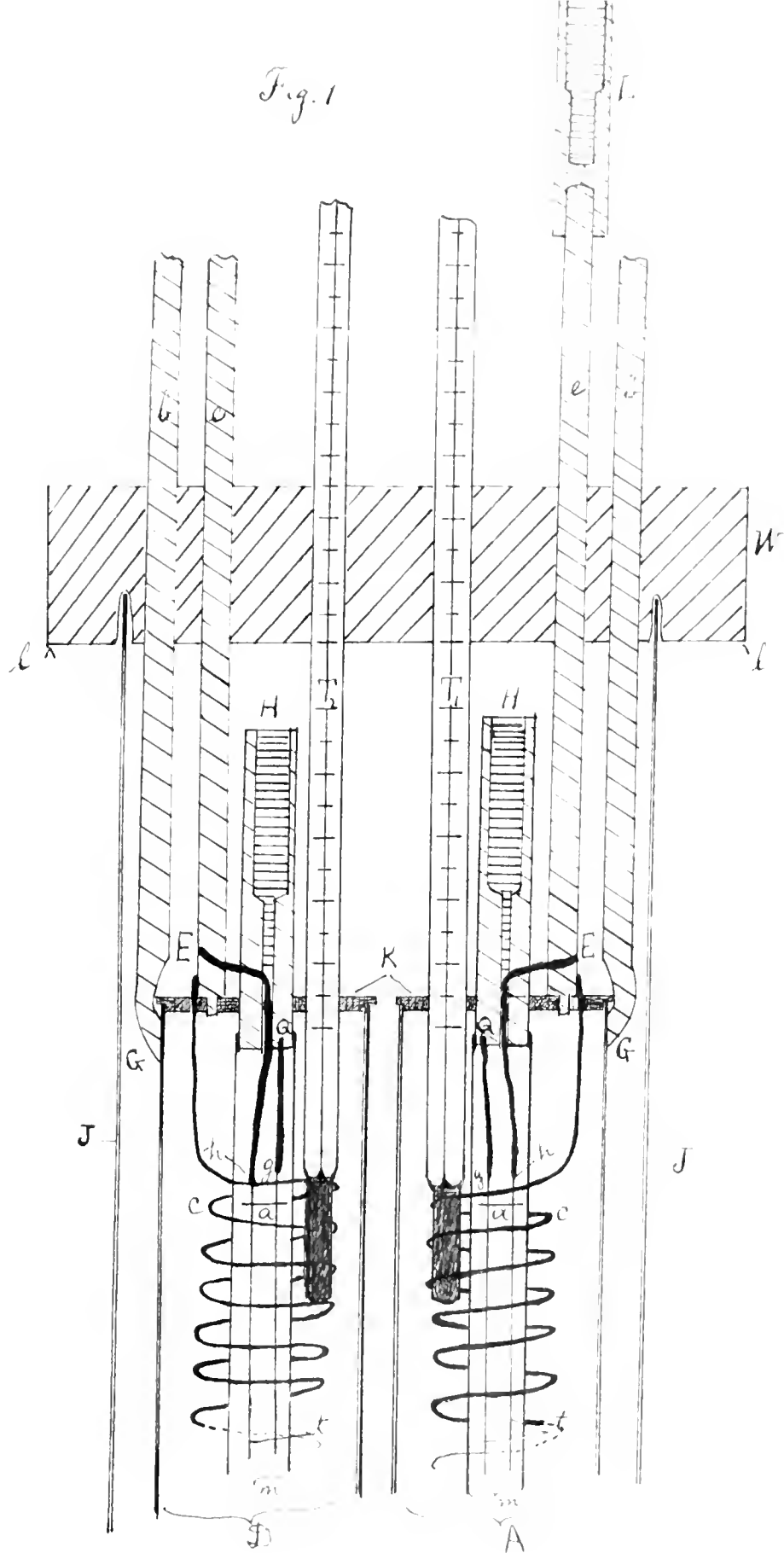
physicists

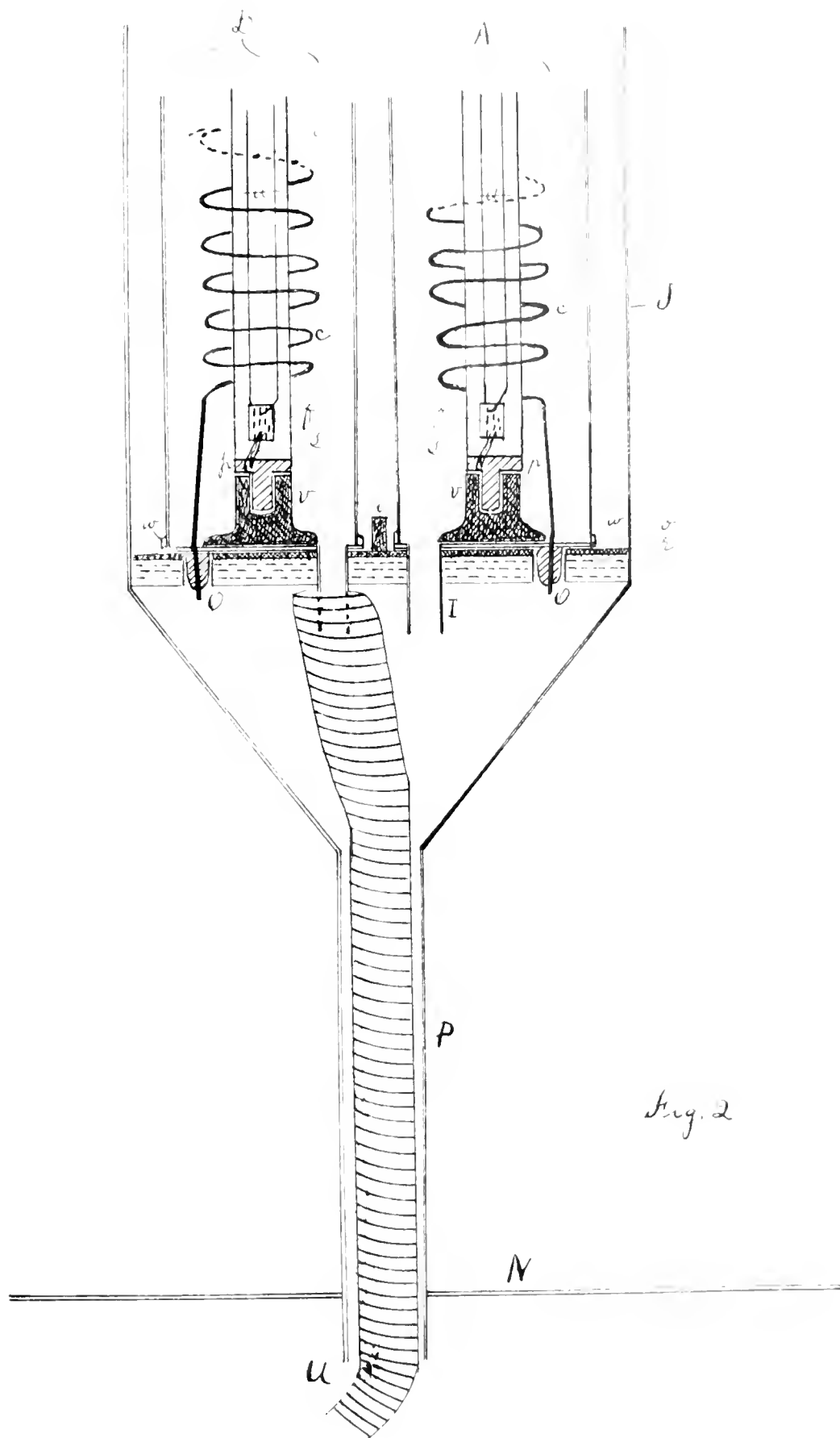
10

I 10 I

20

Fig. 1





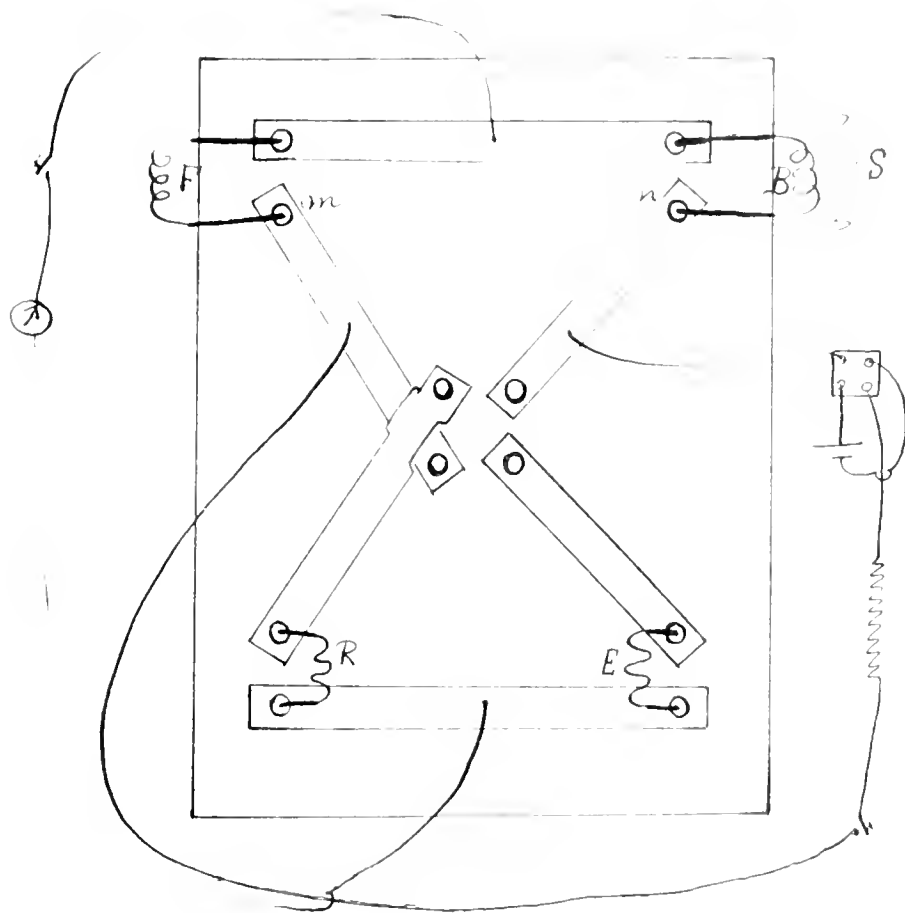


Fig 3



